DOCUMENT RESUME

ED 084 508 CS 000 839

AUTHOR	Young, Jon I.; And Others
TITLE	The Relationship between Stimulus and Response Prompts under Two Types of Programmed Presentations.
PUB DATE	Feb 73
NOTE	19p.; Paper presented at the Annual Meeting of the American Educational Research Assn. (New Orleans, Feb. 26-Mar. 1, 1973)
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Cognitive Processes; College Students; Context Clues; *Learning; *Learning Processes; *Memory; Programed Materials; *Prompting; *Reading Research

ABSTRACT

Prompts in concept classification normally occur on the stimulus, while in memorization tasks prompts customarily are given on the response. Opposite results have been obtained for these two tasks with excessive prompting. This study used English-Russian word pairs to compare stimulus prompts (underlining the English word) with response prompts in contextual and simple (not contextual) memorization tasks. The English-Russian words were taken from Faust and Anderson's article (pp. 3-10) in the 1967 volume of "Journal of Educational Psychology." The results indicated that stimulus prompts produced more correct responses with the no contextual presentation. Stimulus prompts were more effective than response prompts in the contextual presentations. A significant interaction between prompts and presentation was found. (Author/WR)

FILMED FROM BEST AVAILABLE COPY

ED 084508

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

The Relationship Between Stimulus and Response Prompts Under Two Types of Programmed Presentations

Jon I. Young
University of Maine

Richard C. Boutwell
Bucknell University

M. David Merrill
Gerald W. Faust
Brigham Young University

PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY
Jon I. Young
Richard C. Boutwell
TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER.

PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY
M. David Merrill
Gerald W. Faust
TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER.

ABSTRACT

Prompts in concept classification normally occur on the stimulus, while in memorization tasks prompts customarily are given on the response. Opposite results have been obtained for these two tasks with excessive prompting.

English-Russian word pairs were used to compare stimulus prompts (underlining the English word) with response prompts in contextual and simple (not contextual) memorization tasks. The English-Russian words were taken from Faust and Anderson (1967).

Results showed stimulus prompts produced more correct responses with the no contextual presentation. Stimulus prompts were more effective than response prompts in the contextual presentations. A significant interaction between prompts and presentation was found.

CS 000 839

THE RELATIONSHIP BETWEEN STIMULUS AND RESPONSE PROMPTS UNDER TWO TYPES OF PROGRAMMED PRESENTATION

Jon I. Young
University of Maine

Richard C. Boutwell
Bucknell University

M. David Merrill
Gerald W. Faust
Brigham Young University

The conceptual develpoment of theories of instructional psychology came about through the analysis of various behaviors identified as learning. The two most widely used approaches to behavior identification were developed in the works of Gagne (1970) and Bloom (1956). Both investigators developed hierarchies of behavior to illustrate the relationship between different types of learning. The categories in each hierarchy are identified by unique characteristics which include the conditions under which the learning occurs and is expressed. The unique characteristics and conditions of each type of behavior has permitted increased precision in developing the notion that all learning is not identical.

One of the major results of identifying different levels of learning is the reinterpretation of research. The acceptance of a hierarchy of learning behaviors automatically limits the generalization of research results to that specific category of learning wherein the research was conducted. Thus the effect of certain instructional variables on memorization should not be generalized to the level of conceptualization

unless it is tested at that level. This potential problem has not fully materialized completely because the bulk of research on learning has centered on memorization learning. Even after the different levels of learning were established, the situation remained partially dormant because research focused on identifying the differences between the various types of learning. As a result, we can now identify many procedures which are useful in producing a given type of learning but we know very little about those procedures which are useful with more then one type of learning.

One example of this dilemma is illustrated by the research on prompting. Based upon theoretical (Skinner, 1957) experience, educators were cautioned against making the learning task too difficult by not prompting the responses. Prompting soon came to be recognized as a useful learning technique (Cook and Spitzer, 1960; Sidowski, Kopstein and Skillestad, 1961; Levine, 1965).

In 1967, Anderson and Faust argued that too much prompting was detrimental to learning. In separate studies (Anderson and Faust, 1967; Faust and Anderson, 1967) they showed that total prompting permits the student to copy the material without using any or very little cognitive processes. Anderson (1971) concluded that "overprompting" reduces learning and the entire concept needed to be reexamined.

This research, like the bulk of research on prompting, was conducted with learning at the memory level with paired associate learning tasks. More recently prompting techniques have been associated with concept identification tasks, with different results. Merrill and Tennyson (1971) and Young, Smith and Merrill (1972) found that the more prompts available in concept learning tasks, the greater the learning. These results confirm earlier findings (Merrill, 1963; 1965; 1970; Tennyson, Woolley and Merrill, 1972) and the usefulness and possible necessity of strong prompts in concept learning.

The contradictory nature of these findings may be attributed to the inherent differences between memorization tasks or, as proposed in this paper, to the differences in the nature of the prompting procedure. When the task is memorization, the prompts focus attention on the responses. The following task, taken from Anderson and Faust (1967) illustrates this response prompting:

A table is a stahl.

A table is a _____.

In contrast to this illustration, concept acquisition tasks require that the prompt be associated with the stimulus rather than the response. Thus the word "table" in the above illustration would be prompted by an underline. It is possible

that over prompting hinders memorization because it occurs with the response and this effect will disappear or even reverse itself if the prompt occurs with the stimulus.

The purpose of this study was to investigate the effects of prompting the stimulus or response, using memorization tasks under the same conditions of context described by Anderson and Faust (1967). The predictions were:

1. Correct responses will result more often from material embedded in contextual frames then from material presented without context.

2. Stimulus prompts in contextual frames will produce more correct responses then no context frames regardless of the prompting procedures.

3. When prompting occurs on the stimulus, the subject will make more correct responses then when responses are prompted.

METHOD

Subjects

Thirty undergraduate students enrolled in an educational psychology course the summer of 1972 served as subjects. The only variable controlled was experience with the Russian language and students admitting to any contact with this language were excluded from the sample. All other subjects

were randomly assigned to one of the treatment groups.

Design

A simple posttest only design was used with three conditions of prompting (stimulus prompt, response prompt, and no prompt). Each of these conditions were presented using either a contextual or no contextual (simple) program. Figure 1 illustrates this design.

Insert Fig. 1

Material

The Russian words used in this study were the same words used by Faust and Anderson (1967), who obtained the words from a list of 212 four to seven letter words with pronounceability ratings. In this manner, eight easy and eight hard Russian words were used in the programs. The only other constraints were: (a) only common English words were used; (b) no two Russian or English words began with the same letter; (c) no Russian word had an obviously strong association with the English translation. Each pair of words was presented once in each of ten presentations with the order of appearance being randomly determined, independent of any other presentation.

Procedure

Each of the six groups received a training sequence consisting of ten presentations of sixteen English words and the appropriate Russian translation. Each pair of words was presented in a complete sentence with the English word as the subject and the Russian word as the predicate nominative. Each of the ten separate presentations used a random assignment to determine what order each pair of English-Russian words would appear within each presentation.

The No Context treatment presented two sentences for each English-Russian pair of words. The first sentence was complete while the second sentence required the subject to write the appropriate Russian word.

The Context treatment presented each English-Russian pair of words embedded in a five sentence paragraph. Each of the five sentences were composed of an English word as subject and a Russian word as predicate nominative, but only one pair of English-Russian words was the tested pair and the other four English-Russian sentences were randomly chosen as filler sentences. The key sentence appeared in each ordinal position in the paragraph in each set of ten presentations. The context and no context programs are illustrated in Figure 2.

Insert Fig. 2

Within each of these two programs, the prompting condition was varied. In the stimulus prompt condition, the English word was underlined. In the response prompt condition, the Russian word was underlined, and in the no prompt condition neither word was underlined

When the subjects completed all ten presentations, they were asked to write all the Russian words they could remember. When they completed this task, they were given a list of the 16 sentences containing the English word and required to write the Russian word.

RESULTS

The number of errors on both the free recall of all Russian words and the structured test of completing the sentences were analyzed using a two-way analysis of variance. The results of each analysis are summarized in Table 1 and Table 2. The analysis showed that significantly more errors

---

Insert Table 1

Insert Table 2

---

were committed on both tests by those subjects who learned with the no context presentation ($p < .01$ for the structured recall and $p < .005$ for the free recall with 24 degrees of freedom). The mean number of errors with this presentation was greater under all prompting conditions, except the no prompt condition on structured recall where both means were equal ($X = 8.39$).

Using post hoc analysis (tukey a) of individual totals, it was found that the no prompt condition produced significantly ($p < .05$) more errors than either the stimulus prompt or the response prompt conditions on both tests. Additionally, the stimulus prompt condition produced the fewest number of errors on both tests. Further analysis of the interaction effect on the structured test, which is illustrated in Figure 3, showed that response prompting produced the fewest errors

---

Insert Fig. 3

---

when used with a contextual presentation. However, this score was not significantly different from either of the stimulus prompt conditions, but was significantly different

($p < .05$) from the response condition with no context presentation.

DISCUSSION

Two of the three hypotheses of this study were supported by the data and the other hypothesis received partial support. Hypothesis 1 was supported, and the results were in agreement with Faust and Anderson's (1967) findings. Hypothesis 2 was also supported in that the stimulus prompting of contextual material produced fewer error scores than no contextual material regardless of prompting. Hypothesis 3 was supported partially by the finding that stimulus prompts produce fewer errors than all other conditions except response prompts in contextual programs.

These results only partially answer the questions of prompting. It appears fairly conclusive that contextual presentations are more conducive to learning when memory tasks are involved. This finding may or may not hold true for concept acquisition. The question could be answered by a study involving specific degrees of difficulty in identifying the concept.

It would also appear that stimulus prompting is beneficial in memory learning, especially if the no context or simple presentation is employed. Since most research in

concept acquisition uses a no contextual type of presentation, it would follow that stimulus prompting is useful. This assumption would need empirical clarification. The no context presentation appears to have been the reason for an overall lower number of errors by the stimulus prompt groups.

Future research should involve studies similar to this, only using concept acquisition tasks under the same conditions. It should be noted here, however, that the nature of the two tasks will require some thought. Memory tasks are by nature finite in scope, while concept acquisition tasks are infinite and require analysis by the student. Similarly, the exact nature of a prompt to be used in memory and/or concept acquisition would need to be equal. It may be that these concerns can be controlled by considering the presentation in terms of difficulty, either through distraction or concealment and the prompt as an indicator which highlights the correct response or stimulus.

BIBLIOGRAPHY

Anderson, R. C. and Faust, G. W. The effects of strong formal prompts in programmed instruction. American Educational Research Journal, 1967, 4, 345-352.

Anderson, R. C. Two rules for manipulating the sequence of stimuli in concept learning. (Unpublished paper), 1971.

Bloom, B. J. Taxonomy of Educational Objectives Handbook I: Cognitive Domain, New York: David McKay Company, Inc., 1956.

Cook, J. O. and Spitzer, M. E. Supplementary report: Prompting versus confirmation in paired associate learning, Journal of Experimental Psychology, 1960, 59, 275-276.

Faust, G. W. and Anderson, R. C. The effects of incidental material in a programmed Russian vocabulary lesson, Journal of Educational Psychology, 1967, 58, 3-10.

Gagne, R. M. The conditions of learning (Second edition) New York: Holt, Rinehart and Winston, 1970.

Levine, J. M. Prompting and confirmation as a function of the familiarity of stimulus materials, Journal of Verbal Learning and Verbal Behavior, 1965, 4, 421-424.

Markle, S. M. Good frames and bad, New York: Wiley, 1964.

Merrill, M. D. Learning and retention effects of a model and a preview in teaching inaginary science, Urbana, Illinois: University of Illinois, Training Research Laboratory, Technical Report No. 3 USOE Educational Media, Title VII contract 2-20-003, November, 1963.

Merrill, M. D. Correction and review on successive parts in learning a hierarchical task, Journal of Educational Psychology, 1965, 56, 225-234.

Merrill, M. D. Specific review in learning a hierarchical task, Journal of Educational Psychology, 1970, 61, 102-109.

Merrill, M. D. and Tennyson, R. D. Concept acquisition as a function of relationships between positive and negative instances, Final Report of USOE Small Contract 0-14-014, September, 1971.

Sidowski, J. B., Kopstein, F. F. and Shillestad, I. J. Prompting and confirmation variables in verbal learning, Psychology Reports, 1961, 8, 401-406.

Skinner, B. F. Verbal behavior, New York: Appleton-Century-Crofts, 1957.

Tennyson, R. D., Woolley, F. R. and Merrill, M. D. Exemplar and non-exemplar variables which produce correct concept classification behavior and specified classification errors, Journal of Educational Psychology, 1972, (in press).

Young, J. I, Smith, K. H. and Merrill, M. D. The Effects of Review Techniques and Instance Presentation on Concept Learning Tasks, Presented at American Educational Research Association Annual Meeting, April, 1972.

	Stimulus Prompt	Response Prompt	No Prompt
Context			
No Context			

Figure 1. Experimental Design

No Context	A table is a stohl. A table is a
Context	A rag is a tryapka. A bridge is a mohst. A table is a stohl. A college is a vooz. An onion is a look.

Figure 2. Context and No Context Presentation

TABLE 1

Summary Table for Analysis of Variance
on "Free Recall" Posttest

Source	dF	MS	F
Context Condition	1	36.299	11.5238**
Prompt Condition	2	20.033	6.3597*
Interaction	2	6.699	2.1269
ERROR	24	3.250	

* $p < .01$
** $p < .005$

TABLE 2

Summary Table for Analysis of Variance
on "Structured" Posttest

Source	dF	MS	F
Context Condition	1	70.533	8.5668**
Prompt Condition	2	29.633	3.5991*
Interaction	2	32.033	3.8906*
ERROR	24	8.233	

* $p < .05$
** $p < .01$

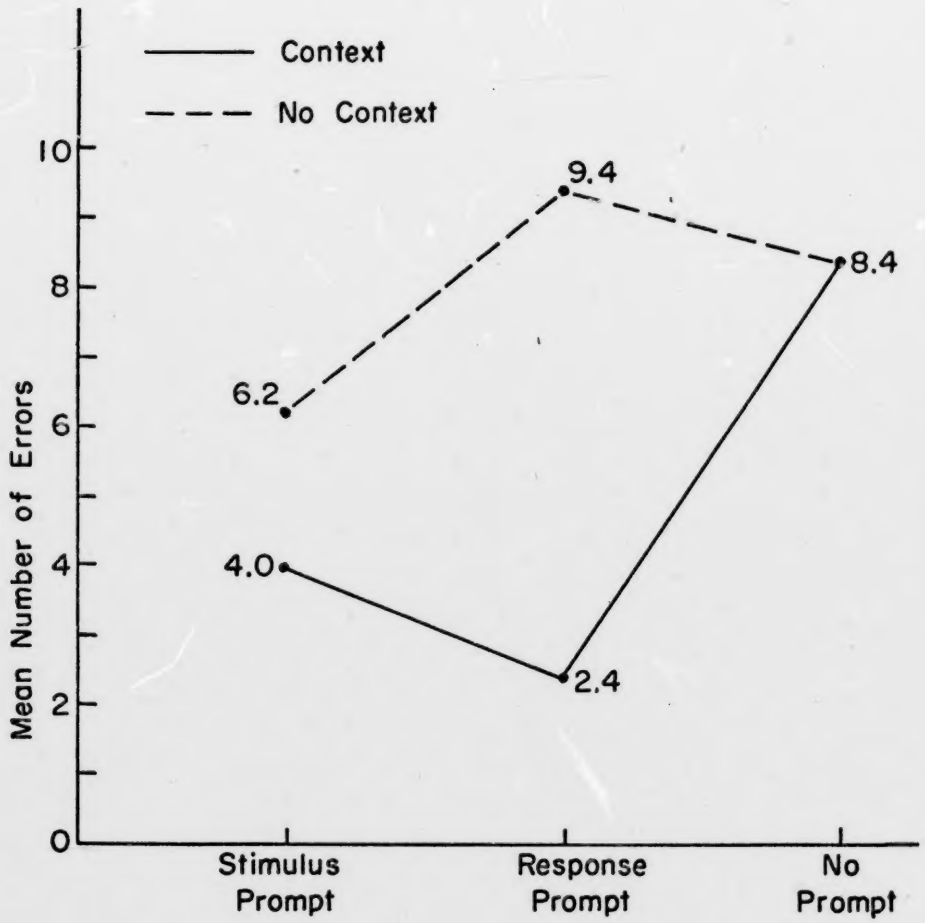
Context
No Context
Mean Number of Errors
10
8
6
4
2
0
9.4
8.4
6.2
4.0
2.4
Stimulus Prompt
Response Prompt
No Prompt

Figure 3. Interaction of prompts and type of presentation